Climate Change and Human Health Literature Portal

National Institute of Environmental Health Sciences

Impact of climate change on global malaria distribution

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Abstract:

Malaria is an important disease that has a global distribution and significant health burden. The spatial limits of its distribution and seasonal activity are sensitive to climate factors, as well as the local capacity to control the disease. Malaria is also one of the few health outcomes that has been modeled by more than one research group and can therefore facilitate the first model intercomparison for health impacts under a future with climate change. We used bias-corrected temperature and rainfall simulations from the Coupled Model Intercomparison Project Phase 5 climate models to compare the metrics of five statistical and dynamical malaria impact models for three future time periods (2030s, 2050s, and 2080s). We evaluated three malaria outcome metrics at global and regional levels: climate suitability, additional population at risk and additional person-months at risk across the model outputs. The malaria projections were based on five different global climate models, each run under four emission scenarios (Representative Concentration Pathways, RCPs) and a single population projection. We also investigated the modeling uncertainty associated with future projections of populations at risk for malaria owing to climate change. Our findings show an overall global net increase in climate suitability and a net increase in the population at risk, but with large uncertainties. The model outputs indicate a net increase in the annual person-months at risk when comparing from RCP2.6 to RCP8.5 from the 2050s to the 2080s. The malaria outcome metrics were highly sensitive to the choice of malaria impact model, especially over the epidemic fringes of the malaria distribution.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3948226

Resource Description

Climate Scenario : ☒

specification of climate scenario (set of assumptions about future states related to climate)

 Representative Concentration Pathway (RCP)

   Representative Concentration Pathway (RCP) : RCP 2.6, RCP 4.5, RCP 6.0, RCP 8.5

Early Warning System: ☒

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

 A focus of content

   ☐

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Exposure : ☒

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Temperature

Temperature: Fluctuations

Geographic Feature: ☒

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☒

resource focuses on specific location

Global or Unspecified

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Mitigation/Adaptation: ☒

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☒

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Methodology

Resource Type: ☒

format or standard characteristic of resource

Research Article, Research Article

Timescale: ☒

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment: ☒

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

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